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USA National Stage Patent Application
PCT/EP00/12824 filed December 15, 2000

Hans-Peter Stang, et al

DYEING OR WASHING INSTALLATION FOR NARROW
TEXTILE FABRIC AND METHOD OF REMOVING AN
EXCESS AMOUNT OF COLORANT OR DETERGENT

Priority: German Patent Application
199 63 854.3 filed December 30, 1999

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

S I R :

PRELIMINARY AMENDMENT

Please amend the National Stage application simultaneously filed
with this amendment as follows:

IN THE ABSTRACT

UNNUMBERED PAGE 14

Cancel the Abstract and replace it with the new Abstract attached
herewith on a separate page.

IN THE SPECIFICATION

Page 1, Line 5, before this line insert the following paragraph
heading:

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FIELD AND BACKGROUND OF THE INVENTION

Page 1, Line 34, before this line insert the following paragraph heading:

SUMMARY OF THE INVENTION

Page 1, please replace the paragraph beginning at line 34 with the following rewritten paragraph:

This series of problems is solved firstly and substantially wherein the narrow fabric is guided along a width-adapted suction nozzle, disposed downstream of the dyeing or washing liquor. This configuration firstly produces an improved, even application of dye to the narrow fabric. In addition, there is improved removal of excess amounts of dyeing or washing liquor. It is preferred for the suction nozzle to be adapted to the width of the narrow fabric, so that uniform suction removal takes place over the entire width of the fabric. In particular, when the suction nozzle is disposed downstream of a dyeing installation, a uniform application of dye in the region of the longitudinal bordering edges of the narrow fabric can be obtained. It is preferred for the suction removal to take place by means of a pre-adjustable vacuum pump. As mentioned, vacuum suction removal of this type, by means of a suction nozzle, may be disposed downstream of a padding machine. In addition, it is also

conceivable for it to be disposed at the outlet of a steamer and of a washing basin. The advantage of vacuum suction removal is better dye penetration in the narrow fabric and an improved possibility for cleaning, and as a result greater fastness. Furthermore, if a suction nozzle according to the invention is disposed on a padding machine, reduced consumption of dye can be obtained. If a drier is provided directly downstream of a washing installation for narrow textile fabrics, provision of a suction nozzle according to the invention in between produces the advantageous effect that less power in comparison with the conventional methods is necessary in the region of the drier, since the suction removal from the narrow textile fabric conducted through the washing installation results in less residual moisture than in the case of the conventional squeezing method. It proves to be particularly advantageous for the negative pressure at the outlet of the suction nozzle to be measured and kept constant at a preset value. Furthermore, in the case of a dyeing or washing installation in which the narrow fabric is passed through the dyeing or washing liquor in a number of passes, it is provided that the removal of the excess amount takes place between two passes of the narrow fabric through the dyeing or washing liquor. It is preferred in this case that the narrow fabric is guided along a suction nozzle after each pass. In a further development of the subject-matter of the invention, it is provided that the suction removal is carried out at right angles to the direction of movement of the narrow fabric. Furthermore, it proves to be advantageous that the width of the suction nozzle can be set according to the width of the narrow fabric in question. The suction removal according to the

invention is conceivable on the one hand for inelastic narrow fabric. In addition, it is also possible for the narrow fabric to consist of elastic material. To counteract irregular dyeing of such material caused by stretching of the elastic fabrics, it is provided that the narrow fabric is guided along the suction nozzle by means of a screen belt. This screen belt serves in the region of the suction nozzle as a support, it being preferred for motor-driven circulating endless screen belts to be provided. Furthermore, it is proposed for the suction removal to take place in the upward and/or downward direction. This configuration allows suction removal to be carried out on one side and on both sides of the narrow textile fabric, it also being possible for the suction nozzle to be disposed vertically and horizontally. In addition, a design in which the suction removal takes place at an inclination with respect to the narrow fabric is also possible. In the case of suction removal from both sides of elastic narrow fabric, it is further preferred for a screen belt to be associated with each suction nozzle, a circulating endless screen belt being preferred, so that the narrow fabric is prevented from stretching both on the upper side and on the underside by means of the screen belt. Moreover, there is the possibility of squeezing taking place upstream of suction removal, so that, for example downstream of a liquor application tank, the narrow fabric is firstly squeezed in a known way and subsequently guided along a suction nozzle, producing a uniform distribution of the dye particles within the fabric. A configuration in which suction removal is carried out from a plurality of narrow fabrics parallel to one another proves to be particularly advantageous. In this case, a width-adapted suction

nozzle may be associated with each narrow fabric, on one or both sides. However, it is also conceivable to dispose a suction nozzle extending over the entire width on one or both sides of the parallel-running narrow fabrics, covering or directing units being provided between the individual fabrics, on the one hand serving as guidance for the fabric and on the other hand confining the suction effect exclusively to the individual fabrics, so that controlled suction removal from the individual fabrics is obtained even in their side edge regions. To reuse excess amounts of dyeing or washing liquor, it is provided that the liquid removed by suction is passed through a water separator and fed back into the dyeing or washing liquor. Furthermore, the narrow fabric may undergo suction removal while running out straight. In addition, the suction removal may also take place through a plurality of layers of the narrow fabric. In an advantageous way, it is provided here that the suction removal from the narrow fabric is carried out while it runs through spirally, to provide a further increase in dye penetration and dye uniformity and also fastness effects. In this respect, it is proposed that the narrow fabric be guided spirally while stretched out on two guiding rollers which are spaced apart from each other, for the narrow fabric to pass a number of times through the dyeing or washing liquor. According to the invention, it is proposed for the suction removal to be simultaneously applied to fabric strands produced by the spiral guidance. The suction nozzle is accordingly not adapted to the individual narrow fabric width. Rather, the suction nozzle width corresponds to the entire widthwise extent of the fabric strands within the spiral guidance.

Page 5, Line 29, before this line insert the following paragraph heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Page 6, Line 25, before this line insert the following paragraph heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Page 10, delete the paragraph starting at line 32.

IN THE CLAIMS

Before claim 1, change "CLAIMS" to --WE CLAIM:--

Please cancel claims 1-18 without prejudice or disclaimer of the subject matter therein and substitute claims 19-36 therefor:

19. (new) Dyeing or washing installation
(1) for narrow textile fabric (2), the narrow fabric (2) being
passed through a dyeing or washing liquor, followed by removal of
the excess amount, wherein the narrow fabric (2) is guided along

a width-adapted suction nozzle (6), disposed downstream of the dyeing or washing liquor.

20. (new) Dyeing or washing installation according to claim 19, wherein the removal of the excess amount takes place between two passes of the narrow fabric (2) through the dyeing or washing liquor.

21. (new) Dyeing or washing installation according to claim 19, wherein the removal by suction is carried out at right angles to direction of movement (r) of the narrow fabric (2).

22. (new) Dyeing or washing installation according to claim 19, wherein the narrow fabric (2) comprises inelastic material.

23. (new) Dyeing or washing installation according to claim 19, wherein the narrow fabric (2) comprises elastic material.

24. (new) Dyeing or washing installation according to claim 19, wherein the narrow fabric (2) is guided along the suction nozzle (6) by means of a screen belt (14).

25. (new) Dyeing or washing installation according to claim 21, wherein the removal by suction takes place in the upward and/or downward direction.

26. (new) Dyeing or washing installation according to claim 19, wherein the removal by suction takes place horizontally and/or vertically.

27. (new) Dyeing or washing installation according to claim 19, wherein the removal by suction takes place at an inclination with respect to the narrow fabric (2).

28. (new) Dyeing or washing installation according to claim 19, wherein squeezing takes place upstream of suction removal.

29. (new) Dyeing or washing installation according to claim 19, wherein suction removal is carried out from a plurality of narrow fabrics (2) parallel to one another.

30. (new) Dyeing or washing installation according to claim 19, wherein liquid removed by suction is

passed through a water separator (10) and fed back into the dyeing or washing liquor.

31. (new) Dyeing or washing installation according to claim 19, wherein the suction removal takes place through a plurality of layers of the narrow fabric (2).

32. (new) Dyeing or washing installation according to claim 19, wherein the removal by suction from the narrow fabric (2) is carried out while it runs through spirally.

33. (new) Dyeing or washing installation according to claim 19, further comprising two deflecting rollers, and wherein the narrow fabric (2) is guided spirally while stretched out on said two deflecting rollers (20, 21) which are spaced apart from each other.

34. (new) Dyeing or washing installation according to claim 32, wherein the removal by suction is simultaneously applied to fabric strands produced by spiral guidance.

35. (new) Method of removing an excess amount of colorant or washing agent from a narrow textile fabric

(2) which is passed through a dyeing or washing liquor in a dyeing or washing installation (1), comprising the further step of guiding the narrow fabric (2) along a width-adapted suction nozzle (6), disposed downstream of the dyeing or washing liquor.

36. (new) Method according to claim 35, wherein the narrow fabric (2) is passed a number of times in succession through the dyeing or washing liquor and subjected to suction removal by means of the suction nozzle (6) to remove an excess amount.

R E M A R K S

This Amendment accompanying this application is being made to cancel claims 1-18 without prejudice or disclaimer of the subject matter therein and to substitute new claims 19-36 therefor, in order to avoid multiple-dependent claim fees and to place this application in proper form and condition for examination as of the filing of this national stage application. No multiple-dependent claim fees apply.

Therefore no multiple-dependent claim fees should be charged in this application.

The specification has also been amended for formal improvement to comply with USA practice.

An Abstract is presented on a separate page herewith.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached pages are captioned "Version with markings to show changes made"

The Examiner is respectfully requested to enter this Amendment prior to calculation of the filing fee as of the national stage filing date, and to provide an action on the merits.

Respectfully submitted
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Page 1, please replace the paragraph beginning at line 34 with the following rewritten paragraph:

This series of problems is solved firstly and substantially [by the subject-matter of Claim 1, based on the idea that] wherein the narrow fabric is guided along a width-adapted suction nozzle, disposed downstream of the dyeing or washing liquor. This configuration firstly produces an improved, even application of dye to the narrow fabric. In addition, there is improved removal of excess amounts of dyeing or washing liquor. It is preferred for the suction nozzle to be adapted to the width of the narrow fabric, so that uniform suction removal takes place over the entire width of the fabric. In particular, when the suction nozzle is disposed downstream of a dyeing installation, a uniform application of dye in the region of the longitudinal bordering edges of the narrow fabric can be obtained. It is preferred for the suction removal to take place by means of a pre-adjustable vacuum pump. As mentioned, vacuum suction removal of this type, by means of a suction nozzle, may be disposed downstream of a padding machine. In addition, it is also conceivable for it to be disposed at the outlet of a steamer and of a washing basin.

The advantage of vacuum suction removal is better dye penetration in the narrow fabric and an improved possibility for cleaning, and as a result greater fastness. Furthermore, if a suction nozzle according to the invention is disposed on a padding machine, reduced consumption of dye can be obtained. If a drier is provided directly downstream of a washing installation for narrow textile fabrics, provision of a suction nozzle according to the invention in between produces the advantageous effect that less power in comparison with the conventional methods is necessary in the region of the drier, since the suction removal from the narrow textile fabric conducted through the washing installation results in less residual moisture than in the case of the conventional squeezing method. It proves to be particularly advantageous for the negative pressure at the outlet of the suction nozzle to be measured and kept constant at a preset value. Furthermore, in the case of a dyeing or washing installation in which the narrow fabric is passed through the dyeing or washing liquor in a number of passes, it is provided that the removal of the excess amount takes place between two passes of the narrow fabric through the dyeing or washing liquor. It is preferred in this case that the narrow fabric is guided along a suction nozzle after each pass. In a further development of the subject-matter of the invention, it is provided that the suction removal is carried out at right angles to the direction of movement of the narrow fabric. Furthermore, it proves to be advantageous that the width of the suction nozzle can be set according to the width of the narrow fabric in question. The suction removal according to the invention is conceivable on the one hand for inelastic narrow fabric. In addition, it is also possible for the narrow fabric to consist of elastic material.

To counteract irregular dyeing of such material caused by stretching of the elastic fabrics, it is provided that the narrow fabric is guided along the suction nozzle by means of a screen belt. This screen belt serves in the region of the suction nozzle as a support, it being preferred for motor-driven circulating endless screen belts to be provided. Furthermore, it is proposed for the suction removal to take place in the upward and/or downward direction. This configuration allows suction removal to be carried out on one side and on both sides of the narrow textile fabric, it also being possible for the suction nozzle to be disposed vertically and horizontally. In addition, a design in which the suction removal takes place at an inclination with respect to the narrow fabric is also possible [conceivable]. In the case of suction removal from both sides of elastic narrow fabric, it is further preferred for a screen belt to be associated with each suction nozzle, a circulating endless screen belt being preferred, so that the narrow fabric is prevented from stretching both on the upper side and on the underside by means of the screen belt. Moreover, there is the possibility of squeezing taking place upstream of suction removal, so that, for example downstream of a liquor application tank, the narrow fabric is firstly squeezed in a known way and subsequently guided along a suction nozzle, producing a uniform distribution of the dye particles within the fabric. A configuration in which suction removal is carried out from a plurality of narrow fabrics parallel to one another proves to be particularly advantageous. In this case, a width-adapted suction nozzle may be associated with each narrow fabric, on one or both sides. However, it is also conceivable to dispose a suction nozzle extending over the entire width on one or both sides of

the parallel-running narrow fabrics, covering or directing units being provided between the individual fabrics, on the one hand serving as guidance for the fabric and on the other hand confining the suction effect exclusively to the individual fabrics, so that controlled suction removal from the individual fabrics is obtained even in their side edge regions. To reuse excess amounts of dyeing or washing liquor, it is provided that the liquid removed by suction is passed through a water separator and fed back into the dyeing or washing liquor. Furthermore, the narrow fabric may undergo suction removal while running out straight. In addition, the suction removal may also take place through a plurality of layers of the narrow fabric. In an advantageous way, it is provided here that the suction removal from the narrow fabric is carried out while it runs through spirally, to provide a further increase in dye penetration and dye uniformity and also fastness effects. In this respect, it is proposed that the narrow fabric be guided spirally while stretched out on two guiding rollers which are spaced apart from each other, for the narrow fabric to pass a number of times through the dyeing or washing liquor. According to the invention, it is proposed for the suction removal to be simultaneously applied to fabric strands produced by the spiral guidance. The suction nozzle is accordingly not adapted to the individual narrow fabric width. Rather, the suction nozzle width corresponds to the entire widthwise extent of the fabric strands within the spiral guidance.

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ABSTRACT

A dyeing or washing installation (1) for narrow textile fabric (2), the narrow fabric (2) being passed through a dyeing or washing liquor, followed by removal of the excess amount. Further advantageously with regard to the application of dye and removal of excess amounts, the narrow fabric (2) is guided along a width-adapted suction nozzle (6), disposed downstream of the dyeing or washing liquor.